ANNEX III

AIR FORCE POSITION ON CAPABILITY OF
CHINESE COMMUNIST RAILROADS

29 January 1954

The Air Force in attempting to determine the capability of the Chinese Communist railroad system has applied four different methods of calculation to figures based, in our estimation, on the most recent information available to the represented intelligence agencies as presented to the joint working group of the Transportation Subcommittee of the EIC. The first two methods (A and B) are based on what the Air Force considers, in the light of railway operating limitations, to be a reasonable estimate of peak Chinese Communist operating capability and differ only in that a slightly different method of calculation was used for each independent calculation by different capable analysts. The third and fourth methods (C and D) were used in order that no approach be overlooked. Method "C" is based on the premise, judged by the Air Force to be highly improbable, that not only do the Chinese outstrip all the free nations of the world for which the Air Force has reliable statistics in railroad operations, but in many aspects surpass and in the remaining aspects approximate the USSR railroad capability. Method "D" is based on an Air Force interpretation of the probable meaning of Chinese Communist published figures as stated in CIA comments on JIC 635/1 and the State Department comments issued to the T.S.C. working group. It is the opinion of the Air Force that the internal consistency of this approach, particularly in light of the fact that all pertinent published figures were interpreted and used, tends to indicate that this may be a valid method of using Chinese Communist railroad statistics. Furthermore this method, for the most part, falls into a pattern which more closely approximates railroad operating performance as it has always been understood by the Air Force.

A. Elements and Calculations in JIC Method*

1. Car Park - 40,000 operable cars

2. Average Load Per Loaded Car - 23.1 tons per car

3. Train Speed - 20 KM per hour (between division stops)

4. Average Time For Division Stops - 6 hours per stop

5. Loading and Unloading Time (Loaded Haul) - 48 hours (per turnaround including initial and final terminals)

6. Average Loaded Haul - 500 KM

7. Pooling and Running Repair Time - 10% of car time

8. Car-Utilization Factor - 60% (% of loaded to total car time)

9. Calculation of Turnaround

Average Haul / Speed = 500 KM / 20 KM/hr =	25 hours
Average Haul / KM per division = 1 x 6 = 3.13 = 1 x 6 =	12.8 hours
Loading, unloading, Initial and final terminal) time (Loaded Haul):	48 hours
TOTAL	85.8 hours
Plus 10% pooling and running repair:	8.6
	94.4
Above total divided by 60% Car-Utilization factor	157.3 / .60/94.4

Turnaround: 157.3 or 6.55 days

10. Cars Per Day

$\frac{40,000}{6.55}$ = 6,107 cars/day

11. Tons Per Day

6,107 x 23.1 = 141,071.7 tons/day (metric)

12. Tons Per Year

365 x 141,071.7 = 51,491,171 tons (metric)

*For justification of items 1, 2, 3 and 6 see part "C"; Items 4, 5, 7 and 8 are taken from JIC 63/1.

B. Elements and Calculations in Theoretical Operation Method*

1. Car Park - 40,000 operable (plus assumed 4% inoperable)

2. Average Load Per Car

a. Car Capacity - 30 metric tons

b. Average Load per Loaded Car - 77% of capacity or 23.1 tons

c. Average Length of Loaded Haul - 500 kms

3. Daily carloadings

$$\frac{41660 = X \times 1.15}{\frac{\frac{500\ KM}{15\ KM/hr} + 92 + 12}{24}} = 6341 \text{ cars loaded per day}$$

4. Average turnaround time - 6.3 days

5. Tons originated per Day

6341 x 23.1 = 146,477 tons

Tons originated per Year

146,477 x 365 = 53,464,105 tons originated per year

*For justification of items 1 and 2 see Part "C".

C. Elements and Calculations in Comparative Method

1. Car Park

40,000 operable freight cars (considered by Air Force /in light of JIC and TSC working group investigations/ to be the most reasonable estimate). See Tab A to Annex I.

2. Average Load Per Loaded Car

a. Car Capacity

30 metric tons (considered by Air Force /in light of TSC working group investigation/ to be the most reasonable estimate)

b. % of Capacity of Average Load per Loaded Car

77% of average car capacity or 23.1 metric tons

(UN statistics available to the Air Force indicate that the highest % of capacity realized per loaded car occurred in Turkey where 70.1% was achieved in 1950. Austrian figures (West Zone) on average load per loaded car handled in that country (approximately 80%) can not be compared to the average capacity of an Austrian owned car, since 28% of loaded cars in Austria are foreign rolling stock which, particularly in the case of the heavy German and Italian transfer traffic and traffic between these countries and Austria, may be carried in much larger cars. /Italian 2 axle cars average 75 to 119% greater capacity than the average for the entire Austrian park./

Sources: Annual Bulletin of Transport Statistics 1950 - Economic Commission For Europe - Transport Division - United Nations. (Average car load in tons) - Appropriate MIS [redacted]

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(Soviet claimed car loadings and tons originated are in general so computed that it is difficult to determine the average load per physical unit. Their car capacity figures are also so computed as to make it difficult to determine the actual capacity per physical unit. If the most optimistic view is taken on all points /from the Soviet viewpoint/ the Soviet average car load would equal approximately 84% of the average car capacity in 1950). Sources: Hunter Soviet Transportation Policy (Draft). Taking a mean between the highest available reliable United Nations estimate and the most optimistic view of the Soviet claims, the Air Force believes, gives a reasonable estimate of a maximum % of load of car capacity for Communist China. See 3b.

3. Turnaround Time 5.57 days

a. Average Length of Haul

500 kms.

(Average length of haul for basic commodities as given in ORR Draft Study on China RR Capability, dated 16 November 1953 /CIA #446212/ is 485 kms. The Air Force believes that the non-basic commodities would have a longer average haul. We also believe that in the light of the heavy traffic to and from the USSR /which if brought as far as Changchun would involve an average haul of 884 kms/ that this (500 km) is a minimum estimate. Furthermore we believe that this figure for present day China as a whole compares favorably with the 332 km figure for Manchuria alone under the Japanese.)

b. Average Length of Trip

714 kms.

(This is based on an ability on the part of the Chinese to find loads immediately for return trips not only at a frequency that is higher than all the nations of the non-Communist world on which the Air Force has statistics, but of material that lends itself to loadings which maintain an over-all % of car capacity level of 77%. In the USSR after 30 years of effort the Soviets have maintained an average of loaded haul to total freight car trip of 71.2% while reaching a claimed average of loads to capacity of 84% /1950/. The above figure assumes an ability on the part of the Chinese to maintain an average of 70% of trip in loaded movement and an average of loads to capacity of 77%.)

c. Travel Time

1. Average Speed Between Division Points - 20 kms p.h.

(The Air Force believes this estimate to be a maximum one in the light of recent JIC and TSC working group investigations and Soviet Russian experience in 1950 /20 km/p.h./).

2. Average Time in Motion (Including Way Stations) Per Turnaround - 35.7 hrs.

(714 km + 20 km per hr. = 35.7 hrs.)

3. Average Stopping Time Per Turnaround - 50.1 hours

(exclusive of loading and unloading time)
(This figure is believed to be a minimum figure since it is the amount of time used by the Soviets in a haul of this length)

4. Loading and Unloading Time Per Turnaround - 48 hours

(including switching to and from loading and unloading points outside large initial and final terminal yards)

(This time is considered to be a minimum time for the Chinese Communists, by the Air Force, since it is almost two hours less than the average time taken by the Soviets in 1950 for the same operation)

4. Tons Originated Capability

165,881 metric tons daily; 60,546,565 metric tons per annum.

(40,000 cars ÷ 5.57 days = 7,181 cars loaded daily
7,181 x 23.1 (tons per car) = 165,881 tons daily x 365 = 60,546,565 per annum)

D. Elements and Calculations in Method Based on Chinese Communist Figures

1/	131,000,000	Net Tons Handled
2/	59,500,000,000	Gross Ton Kilometers (loaded and empty)
3/	28.7	Net Tons per car
4/	17.3	Tare wt. per car (Gross ton kms - net ton kms = tare ton kms ÷ car kms = tare wt. per car.)
5/	2.9	Days transit time
6/	237.3	Km per day av. distance per car handled
7/	12,504	Loaded cars per day hauled
8/	66%	Loads
9/	34%	Empties
10/	18,945	Cars per day hauled loads and empties $\left(\frac{12,504}{.66}\right)$

a. Loaded cars per day handled

$$\frac{131{,}000{,}000}{365 \times 28.7} = 12{,}504$$

(1) $\frac{12{,}504}{2.9}$ = 4,312 car loads per day originated

b. Av. gross ton per car handled

$$\frac{(17.3 \div 28.7)\ 66 + (17.3 \times 34)}{100} = 36.24$$

8/ and 9/

c. Gross ton kms per annum

(1) 10/ 18,945 x b. 36.2 x 6/ 237.3 x 365 = 2/ 59,466,400,084

(2) 7/ (12,504 x 3/ 28.7 x 6/ 237.3 x 365) + 10/ (18,945 x 4/ 17.3 x 6/ 237.3 x 365)

(Net ton Kms per annum) 31,082,895,205 (Tare ton Kms per annum) 28,387,772,435 = 59,470,667,630

d. Tons originated

$$\frac{131,000,000}{(365 \times 2.9)} = 123760$$

$$\frac{1250\frac{1}{4}}{2.9} \times 28.7 = 123,746 \text{ net tons orig/day}$$

45,167,290 net tons orig. per annum (metric)

e. Length Haul

1. Individual Railway

$$\frac{31,082,895,205}{131,000,000} = 237.3 \text{ kms.}$$

2. System

$$\frac{31,082,895,205}{\frac{131,000,000}{2.9}} = 688.17 \text{ kms.}$$